NAME: DATE:

Mastery Assessment of Unit 2 (Solution version 117)

Question 1

Let f represent a function. If $f[4] = 30$, then there exists a knowable solution to the equation below.

$$y = \frac{f[2\,(x - 17)]}{15} + 23$$

Find the solution.

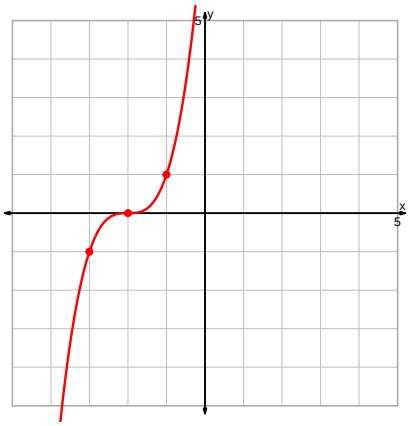
$x = 19$

$y = 25$

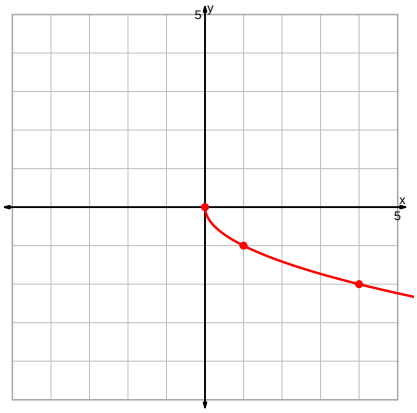
Question 2

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

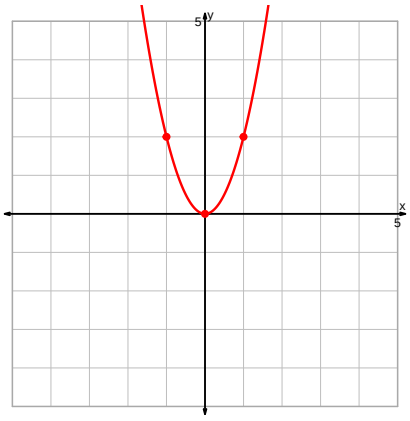
$y = (x+2)^3$



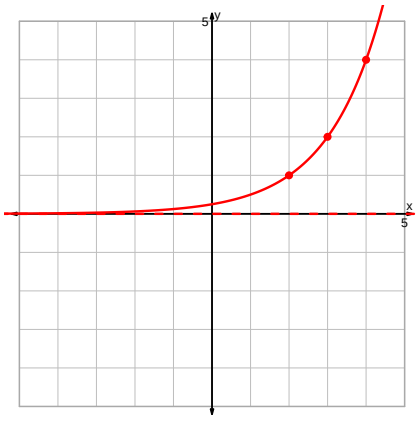
$y = -\sqrt{x}$



$y = 2 \cdot x^2$

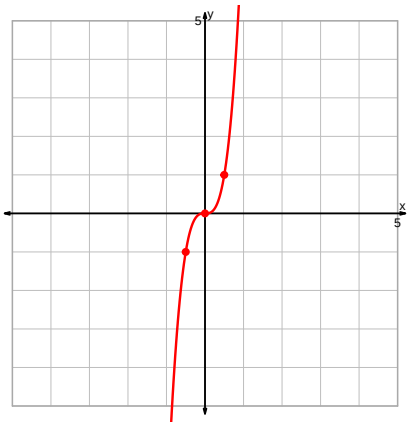


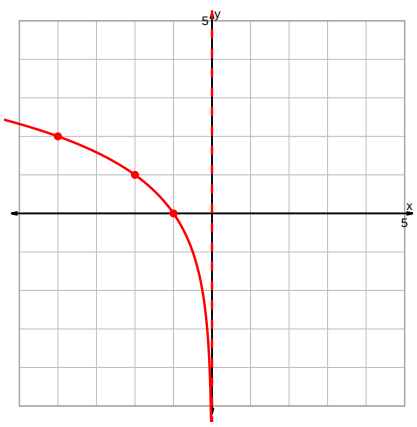
$y = 2^{x-2}$



Question 2 continued. . .

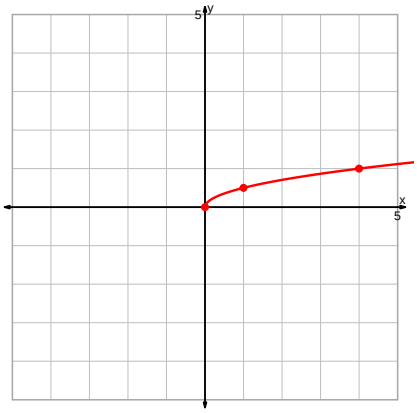
$y = (2x)^3$

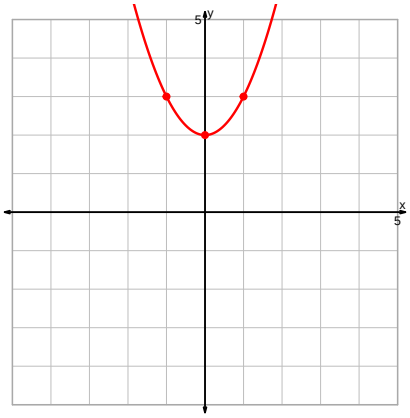




$y = \log_2(-x)$

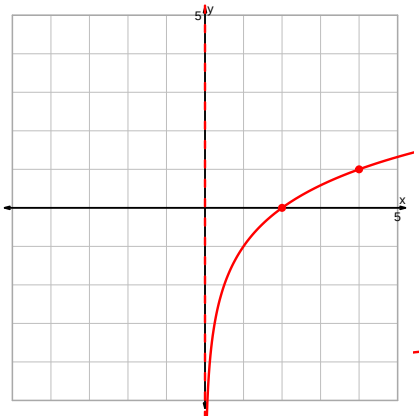
$y = \frac{\sqrt{x}}{2}$

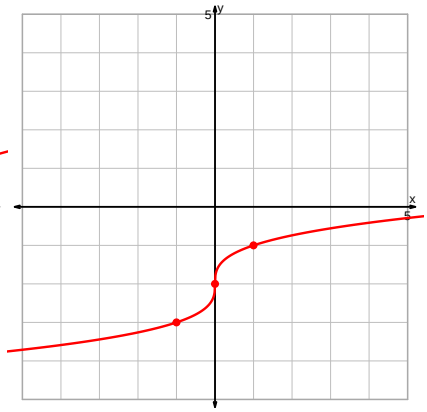




$y = x^2 + 2$

$y = \log_2\left(\frac{x}{2}\right)$

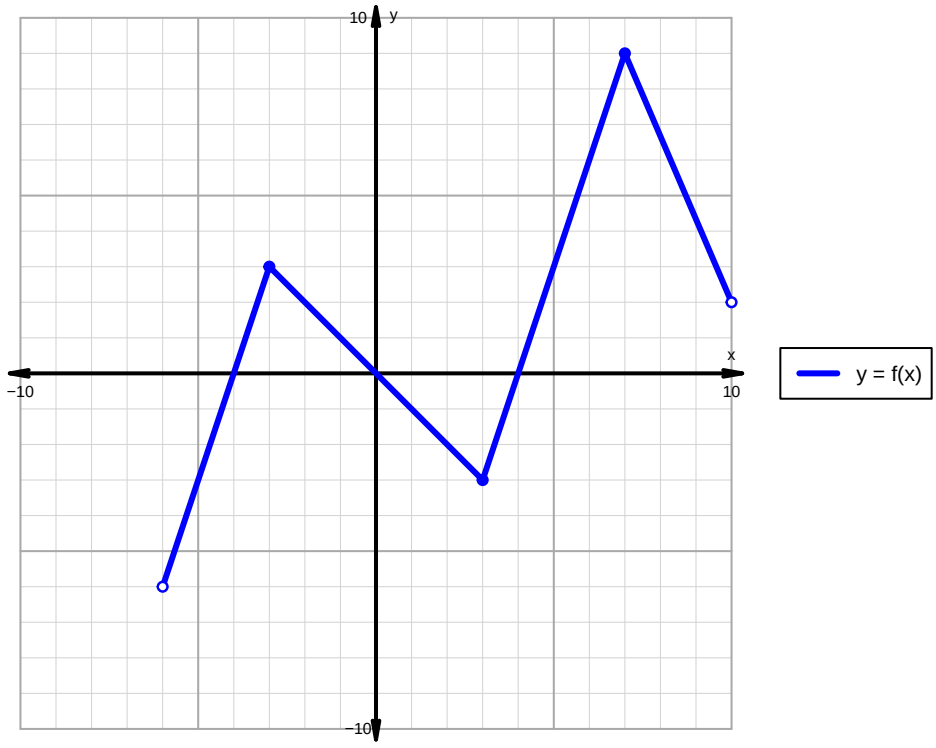




$y = \sqrt[3]{x} - 2$

Question 3

A function is graphed below.



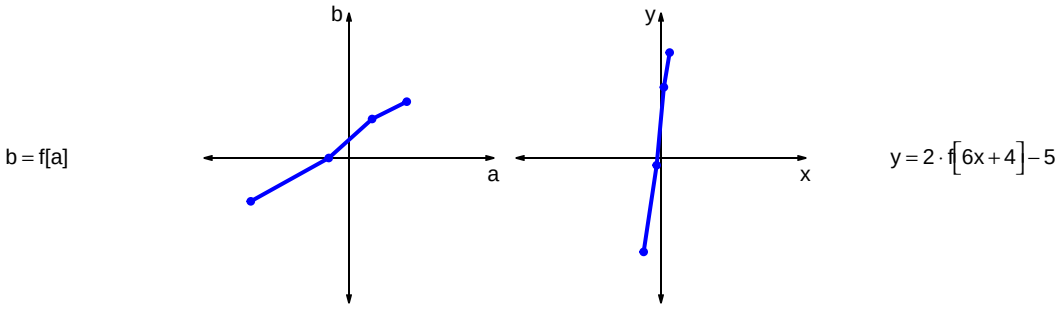
Indicate the following intervals using interval notation.

Feature	Where
Positive	$(-4, 0) \cup (4, 10)$
Negative	$(-6, -4) \cup (0, 4)$
Increasing	$(-6, -3) \cup (3, 7)$
Decreasing	$(-3, 3) \cup (7, 10)$
Domain	$(-6, 10)$
Range	$(-6, 9)$

Question 4

Let f represent a function. The curves $b = f[a]$ and $y = 2 \cdot f[6x + 4] - 5$ are represented below in a table and on graphs.

a	b	x	y
-68	-30	-12	-65
-14	0	-3	-5
16	27	2	49
40	39	6	73



a. Write formulas for calculating x from a and calculating y from b. (Or, write the coordinate transformation formula.)

$$x = \frac{a - 4}{6}$$

$$y = 2b - 5$$

Or, you can write the formulas as a coordinate transformation:

$$(a, b) \to \left(\frac{a - 4}{6} \ , \ 2b - 5 \right)$$

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = 2 \cdot f[6x + 4] - 5$?

1. Translate left by distance 4.
2. Horizontal shrink by factor 6.
3. Vertical stretch by factor 2.
4. Translate down by distance 5.

Or, technically, the vertical transformations could come first.

1. Vertical stretch by factor 2.
2. Translate down by distance 5.
3. Translate left by distance 4.
4. Horizontal shrink by factor 6.

Question 5

A parent square-root function is transformed in the following ways:

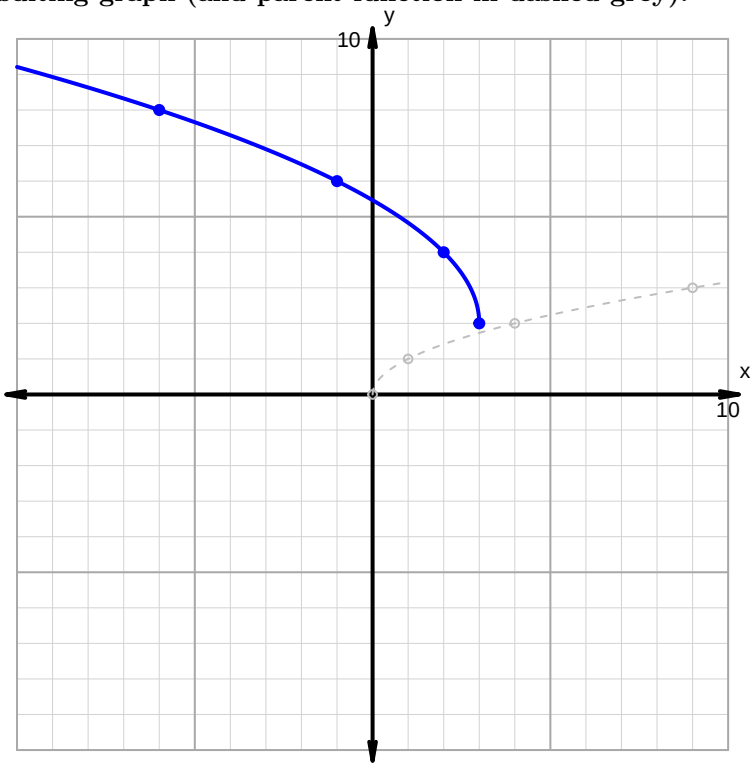
Horizontal transformations

1. Horizontal reflection over y axis.
2. Translate right by distance 3.

Vertical transformations

1. Translate up by distance 1.
2. Vertical stretch by factor 2.

Resulting graph (and parent function in dashed grey):



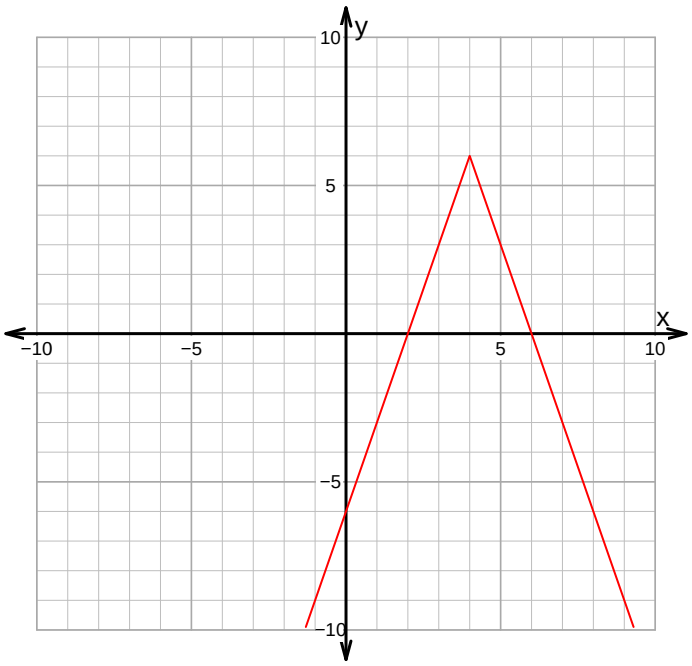
- What is the equation for the curve shown above?

$$y = 2 \cdot \left(\sqrt{-(x-3)} + 1 \right)$$

Question 6

Make an accurate graph, and describe locations of features.

$$y = -3 \cdot |x - 4| + 6$$



Feature	Where
Domain	$(-\infty, \infty)$
Range	$(-\infty, 6]$
Positive	$(2, 6)$
Negative	$(-\infty, 2) \cup (6, \infty)$
Increasing	$(-\infty, 4)$
Decreasing	$(4, \infty)$